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Institute of Naval Studies

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THE U.S. NAVY IN THE 1980S

INTRODUCTION

The U.S. emerged from World War II with the most powerful Navy that ever put to sea. The Cold War and the Korean War put an end to efforts to demobilize this force and caused the U.S. to begin maintaining a large portion of it on active duty, with major fleets stationed far from U.S. shores in support of America's interests and those of her allies and friends. Since then, many things have made the Navy's job more difficult, including extraordinary technological advances and massive increases in costs. At the same time, the Navy's main rival, the Soviet Navy, has developed from a coast-defense force to an open-ocean navy with substantial military capabilities. The result of these changes is that the U.S. Navy no longer has the absolute naval supremacy at sea that it had at the end of World War II. However, even a brief look at today's Navy suggests that it is still the world's most powerful fleet and that it is capable of prevailing over its opposition in most situations, particularly with the support of its allies.

The task of U.S. Navy planners today is to ensure that the Navy retains the impressive capabilities that it has today and that it is able to establish and maintain a substantial, if not

absolute, margin of naval superiority over the Soviets in the future. It appears that current plans for the future of the U.S. Navy, notably the budget increases ordered by the Reagan Administration, can achieve this objective. The purpose of this article is to examine these plans as they existed at the end of March 1981, particularly those that will determine the future of the Navy's ships and aircraft.

MISSIONS OF THE NAVY

The first step in planning the future of the Navy's forces is to identify the missions that that they must be able to carry out. Since World War II, the missions of the U.S. Navy have changed less than those of most other navies (notably those of the colonial powers and the Soviet Union). In the mid-1970s, after the Vietnam War, the Navy had difficulty formulating these in a way that was acceptable to Congress and the Defense Department, but recent events, notably those in the Persian Gulf, appear to have produced a new consensus on the Navy's missions.

At the most basic level, the responsibility of the Navy as outlined by the current Chief of Naval Operations, Admiral Thomas B. Hayward, consists of supporting three basic national defense objectives. The first objective is prevention of nuclear war through deterrence. The Navy contributes to this by maintaining

a ballistic-missile submarine (SSBN) force that can survive any surprise Soviet first strike, respond with an appropriate counter strike if desired, and retain sufficient strength to deny the Soviets any hope of achieving their war aims, either through violence or negotiations.

The second U.S. defense objective is to defend the territory of the U.S. and her allies against major Soviet aggression. The Navy contributes to this in two ways: by ensuring that the U.S. can move reinforcements and supplies from positions in the rear (particularly the U.S.) to the war zone in Europe, and by ensuring that the Soviets cannot cripple the allied war effort by cutting off the flow of resources essential to the military forces and economies of the West.

The third U.S. defense objective is to protect U.S. interests against smaller-scale aggression by the Soviets or by other countries, notably in Third World areas. Such aggression, if allowed to recur, could ultimately do as much damage to Western security as a single major offensive. The Navy supports this objective by providing a capability to oppose such aggression rapidly, either at the place where it occurs or at a place where the U.S. would have a significant military advantage.

It should be noted that the three non-strategic "missions" formerly attributed to the Navy (sea control, power projection and

peacetime presence) are no longer called missions but are considered to be types of actions that the Navy performs in order to carry out the missions just described.

The specific policies that the U.S. has adopted in order to achieve its defense objectives have several characteristics in common. First and foremost, they are based upon the principle of deterrence through strength: by providing the U.S. with the strength to defeat aggression at any level of conflict, they attempt to ensure that aggression will not occur. But in today's world, U.S. strength alone is not sufficient, and U.S. defense policies are also based upon collective security, that is to say, close coordination with allies. This commits the U.S. to an expensive forward defense posture, stationing and operating its forces worldwide. However, U.S. planners believe that such a posture, backed by allied cooperation, is the only way to make the Western defense effort successful.

Admiral Hayward and other Navy leaders feel that the fleet must also have several basic characteristics if it is to succeed in supporting U.S. defense objectives. The Navy's forces must have a truly global reach, meaning that they can go anywhere and support themselves there for an extended period. This is necessary because Western interests are worldwide in scope and because a major war with the Soviets would probably also be worldwide. In addition, the Navy must maximize the flexibility of its forces so that they can carry out many different types of tasks in different

parts of the world. Flexibility has always been an inherent characteristic of naval forces, but it needs to be emphasized even more in today's complex world, so that the Navy can respond quickly to the wide variety of contingencies that could arise.

The current Chief of Naval Operations also stresses two additional characteristics of the fleet that were not emphasized to the same degree by his predecessors. The first is that, in the event of war, the Navy must have offensive power, that is to say, the capability to go on the offensive against the Soviet Navy wherever it may be. The best way to defend the sea lanes, in his view, is to force the Soviets into a defensive action close to the Soviet homeland, far from the sea areas vital to the West. The second characteristic is an outgrowth of the first: the fleet must have the technological sophistication needed to meet the best Soviet technology -- which today appears to be very good. In the early 1970s, a distinction was made between "high-mix" forces (units which had the best technology but which were too expensive to be built in large numbers), and "low-mix" forces (less sophisticated units that could be built in quantity). In subsequent budgets, there was a tendency to fund low-mix forces to supplement the high-mix forces ordered in the late 1960s. Today, Admiral Hayward is arguing that the time has come for a return to construction of high-mix forces.

STRUCTURING THE FLEET

Before realistic plans for the Navy's future can be made, one additional factor must be taken into account: cost. It is easy to design a fleet that could carry out the missions just described, but it is very hard to design one that can do so without being too expensive for the nation -- even a nation like the U.S. -- to afford. In recent years, cost constraints have forced the Navy to assign priorities to its missions and accept a certain degree of risk that it might not be able to fulfill some of them. Each administration had its own opinions concerning the proper tradeoff between cost and risk, and the Reagan Administration has already made it clear that it is less willing to accept risk than the Carter Administration and its immediate predecessors. It has already accepted increased costs in the 1981 and 1982 budgets: whether it can continue to do so in future years remains to be seen.

Carter and Reagan naval plans agree as the nature of the principal components of the fleet. These are strategic submarines, carrier battle groups (one or more aircraft carriers with their escorts), convoy escort forces, amphibious forces and attack submarines. Proposals have been made in the press and by certain members of Congress to eliminate some of these components, (notably the large aircraft carrier) and introduce others (such as smaller carriers or surface-effect ships). These proposals have

failed for two reasons: any rapid restructuring of the fleet along such lines would be prohibitively expensive, and the traditional types of forces still have strong support in the Navy and, perhaps even more important, in Congress. These categories of forces (along with supporting categories such as minecraft and auxiliaries) will therefore continue to be the basic components of the future Navy.

The two administrations appear to differ, however, concerning the number of each type of ship that the Navy needs. The Carter Administration decided that the general-purpose Navy would be adequate if it could do three things: provide 12 carrier battle groups (each with one carrier plus its escorts), lift the assault echelon of 1.15 Marine Amphibious Force to an overseas destination, and provide escorts for some military convoys to Europe in a NATO war. (Allied support in the convoy effort was, and still is, considered essential.) This fleet was also to contain 90 nuclear attack submarines. These numbers reflected severe fiscal constraints, and Navy leaders were unhappy with them. Admiral Hayward pointed out in 1980 that the Navy could not undertake all desirable operations simultaneously but would have to adapt "a strategy of sequential offensive operations based on a careful prioritization of objectives...to succeed in gaining effective control of those sea areas essential to successful prosecution of a global war." In addition, he has stated that the Navy can no longer fully meet its peacetime commitments, and that to maintain

even minimal forces (one carrier plus supporting ships) in the Mediterranean and the Pacific plus two carriers in the Indian Ocean, it has to impose on its forces' operating schedules more arduously than any imposed during the Vietnam War. The Carter Administration considered that the Navy should base additional ships overseas, including one or more carrier battle groups, to solve this deployment problem, but these efforts have not, to date, met with success. The Reagan Administration has at least initially relaxed the fiscal constraints on military planners, and Navy leaders, including Admiral Hayward and Secretary of the Navy John Lehman, are now both advocating a 600-ship Navy that can, among other things, provide 15 carrier battle groups, 100 nuclear attack submarines, and ships for 1 1/2 Marine Amphibious Force. Admiral Hayward states that such a force would do away with the excessive risks of a strategy dependent upon sequential campaigns. In addition it would permit the Navy once again to meet fully its peacetime commitments and to reduce the strain on its equipment and people that, today, is excessive.

With the change in administration, the Navy's plans for the future of each of its major categories of forces will clearly have to be changed. Several things, however, can already be said about the future plans. First, it appears that all of the main categories of forces will be retained in roughly their present form. Second, the plans made under the Carter and previous administra-

tions can be regarded as minimums which the Reagan Administration will try to exceed. With these guidelines in mind, we will first look at the forces the Navy has today and then look at its plans for the future of each force category.

CURRENT FORCES

As of 31 March 1981, the U.S. Navy had 528 ships (excluding some civilian-manned auxiliaries). These ships are listed by type in table 1, along with estimates of the strength of the Navy at the end of Fiscal Years 1981 (30 September 1981) and 1982 according to the final plans of the Carter Administration, which date from late 1980.

The Navy contains more than ships, however. Each of the 12 carriers now in service has a carrier air wing, composed of squadrons of different types of aircraft. There are also two reserve carrier air wings. The components of a typical active carrier air wing are listed in table 2.

TABLE 1
CURRENT U.S. NAVY FORCES

<u>Type</u>	<u>Actual</u> <u>31 Mar 81</u>	<u>Planned</u> <u>30 Sep 81</u>	<u>Planned</u> <u>30 Sep 82</u>
<u>Strategic Forces</u>			
Ballistic Missile Submarine	35	32	33
Surface Combatants: Battle Groups			
Aircraft Carriers (1)	12	12	13
Cruisers	27	27	27
Destroyers	80	82	84
Surface Combatants: Convoy Escorts			
Frigates	74	79	88
Reserve Destroyers (2)	9	9	5
Attack Submarines			
Nuclear (3)	78	82	91
Diesel	5	5	3
Patrol Combatants	3	1	6
Amphibious	65	65	66
Minesweepers (4)	25	25	25
Mobile Logistics Support Force (5)	74	73	72
Other Auxiliaries (6)	41	40	40
Miscellaneous	<u>7</u>	<u>7</u>	<u>6</u>
TOTAL	535	539	560

NOTES: -----

- (1) Does not include one carrier in overhaul under the Service Life Extension Program (SLEP) each year.
- (2) Training ships for the Naval Reserve Force (NRF) capable of operating with the fleet.
- (3) Includes ballistic missile submarines converted to attack submarines.
- (4) 22 of the 25 minesweepers are reserve units of the NRF.
- (5) Underway replenishment ships, repair ships and tenders.
- (6) Includes 7 Near-Term Prepositioning Ships stationed at Diego Garcia in support of the Rapid Deployment Force. These ships have since been transferred to a category not on this list (Military Sealift Command ships not in the Naval Fleet Auxiliary Force), and the official size of the fleet on 31 March 1981 was therefore 528 ships.

TABLE 2
TYPICAL CARRIER AIR WING

<u>Aircraft type</u>	<u>Function</u>	<u>Squadrons</u>	<u>Aircraft</u>
F-4, F-14	Fighter (reconnaissance)	2	24
A-7, A-18	Light attack	2	24
A-6, KA-6D	Medium attack, tanker	1	14
S-3A	ASW (fixed wing)	1	10
SH-3H	ASW (helicopter)	1	6
EA-6B	Electronic warfare	1	4
E-2C	Airborne early warning	<u>1</u>	<u>4</u>
TOTAL		9	86

In addition, the Navy contains 24 active and 13 reserve squadrons of P-3 Orion maritime patrol aircraft, and six squadrons that provide the LAMPS Mark 1 helicopters that operate from cruisers, destroyers, and frigates. There are also various types of shore-based support and training aircraft.

Finally, there is a U.S. military service, the U.S. Coast Guard, that is not under naval control but which fulfills missions assigned to many European navies and which would become part of the Navy in wartime. The U.S. Coast Guard has 12 modern high-endurance cutters in service, four new medium-endurance cutters under construction, and more planned; all of which could operate ASW helicopters in wartime. Its other major units are seven high-endurance cutters dating from World War II and 16 medium-endurance cutters dating from the 1960s.

One of the things one hears most often about the U.S. Navy is that it is much smaller than it used to be. This is confirmed by table 3, which shows that the number of ships in the Navy today is only about half of what it was in 1965. This does not mean, however, that the strength of the Navy has been reduced by half. The tonnage of the Navy today is only 20 percent less than its tonnage in 1968, and the technical sophistication (and cost) of individual units has been greatly increased. In addition, numerical strength has been retained in some of the more important combatant categories. The attack carrier force has declined from only 16 to 13 (counting one carrier in overhaul under the Service Life Extension Program). It is worth noting that, in the years since World War II (with one exception in 1956), the Navy has never had more than 17 attack carriers in service. The cruiser force has remained constant, if one uses the current U.S. definition of cruiser, while the frigate force has actually increased in size. The nuclear submarine force has increased greatly, replacing a diesel submarine force that was larger in size but vastly inferior in capability. The principal reductions in the size of the fleet include the elimination of ASW carriers, the disposal of all but a handful of World War II destroyers, the disposal of 3/4 of the minesweeper force, and a reduction in the auxiliary force proportional to the overall reduction in the fleet. In addition, the capacity of the amphibious force has been reduced from 2 to 1.15 Marine Amphibious Forces, and the number of amphibious ships has

TABLE 3
U.S. NAVY STRENGTH, 1965 AND 1981

<u>Type</u>	<u>1965</u>	<u>1981</u>
Attack carriers	16	12 (+1)
ASW carriers	9	0
Cruisers (1)	26	27
Destroyers	242	89
Frigates (2)	60	74
Patrol combatants	15	3
Submarines		
Ballistic Missile	29	35
Nuclear	22	78
Diesel	100	5
Minesweepers	95	25
Amphibious	150	65
Auxiliaries and Miscellaneous (3)	<u>257</u>	<u>122</u>
	1,021	535
Active Maritime		
Patrol Squadrons (4)	31	24

NOTES:

- (1) Including those formerly rated DLG.
- (2) Including ex-DE and DER.
- (3) Includes CC, CVT, MCS, and experimental.
- (4) The 1965 figure includes three seaplane squadrons.

been reduced by more than half, due to the replacement of numerous smaller ships by fewer larger and more capable ones.

One positive result of those changes is that the fleet is much younger than it was even a few years ago. The average age of the active fleet at the end of Fiscal Year 1981 will be 14.6 years. The average age of selected categories of ships is given in table 4. Most of the major categories of combatants now average less than 15 years in age, theoretically young enough for an orderly replacement program to keep up with the aging process.

TABLE 4
AVERAGE AGE OF THE ACTIVE FLEET
(END FY 1981)

Aircraft carriers	20.3
Cruisers	14.2
Destroyers	14.0
Frigates	9.7
Nuclear-powered attack submarines	12.2
Amphibious ships	14.5
Mine warfare ships	26.8
Auxiliaries	19.8

FUTURE PLANS

The objective of the Navy's planning for the future is to establish and maintain a margin of superiority over the Soviet Navy sufficient to allow it to fulfill its wartime missions. To do this, the Navy feels that it must maintain, or if possible in-

crease, the number of ships in the fleet while giving its ships and aircraft systems that can defeat the best Soviet technology. The primary means of doing this is the orderly replacement of ships that are becoming overaged by construction of modern ones. (Modernization of existing ships now plays a major role only in the maintenance of the carrier force, although existing ships, particularly cruisers and destroyers, are currently being updated with new equipment.)

It was estimated under the Carter Administration that to maintain its existing force of about 550 ships and its current inventory of aircraft, the Navy would have to build 17 to 18 ships and 330 aircraft each year. The Navy's leaders are now advocating a 600-ship Navy that includes 15 carrier battle groups. (This increase is larger than it appears, for the proposed 600-ship Navy excludes the ships of the Military Sealift Command and the Naval Reserve Force that were included in Carter's 550-ship Navy and that will remain in service: these categories contained 73 ships in March 1981). To do this, the Navy estimates it will have to build or modernize 30 ships per year. This level is, in fact, exceeded in the revised 1982 budget, the only Reagan budget so far prepared.

A regular part of the annual U.S. budget-planning process is the production of a Five-Year Defense Plan (FYDP). The most re-

cent FYDP is the one produced by the Carter Administration in support of its 1982 budget. The Reagan Administration did not revise this FYDP when it modified the 1982 budget and will not publish its first FYDP until January 1982. Tables 5 and 6, which cover ships and aircraft, respectively, present the best information now available on the program for the next five years: Reagan's requests for 1982 and Carter's proposals for 1983 through 1986 with a few additions and changes that have already been announced by Reagan. (Reagan's 1983 requests for aircraft have been announced and are given.) The figures for 1983-86 are likely to be revised completely, and are useful only in that they indicate the types of ships and aircraft that are likely to be built in these years. The tables also give information on actual procurement during several years before 1982.

Strategic Forces

The first of the main categories of forces in the U.S. Navy that we will discuss is its strategic forces. The Navy is currently engaged in replacing its first-generation ballistic missile submarines (SSBN) with the new-generation Trident class. The Trident-class submarine is enormous in comparison with any other submarine except the new Soviet Typhoon: when submerged, its displacement exceeds the standard displacement of the largest heavy cruiser ever built. Its ultra-modern technology and the long

TABLE 5
U.S. NAVY SHIP PROCUREMENT, FISCAL YEARS 1979-1986

	Actual			Requested	Projected			
	FY79	80	81	(Reagan) 82	(Carter, modified) (83)	(84)	(85)	(86)
<u>Strategic Forces</u>								
SSBN-726	--	1	1	1	1	1	2	1
<u>Surface Combatants- Battle Groups</u>								
CVN-68	--	1	--	--	1	--	--	--
CG-47	--	1	2	3	2	4	4	4
DDG-993 (acquired)	4	--	--	--	--	--	--	--
New DDG	--	--	--	--	--	--	--	1
<u>Surface Combatants- Convoy Escorts</u>								
FFG-7	8	5	6	3	--	--	--	--
New FF	--	--	--	--	--	1	2	3
<u>Attack Submarines</u>								
SSN-688	1	2	2	2	1	1	1	2
New SSN	--	--	--	--	--	--	1	--
<u>Amphibious Warfare</u>								
LSD-41	--	--	1	--	1	--	--	--
<u>Mine Warfare</u>								
MCM	--	--	--	1	--	4	4	4
<u>Rapid Deployment Force Auxiliaries</u>								
(Built)	--	--	--	1	1	2	2	2
(Acquired)	--	--	--	11	3	--	1	--
<u>Other Auxiliaries</u>								
(Built)	1	1	6	7	4	6	2	3
(Acquired)	--	--	1	2	--	3	--	--

TABLE 5 (CONTINUED)
U.S. NAVY SHIP PROCUREMENT, FISCAL YEARS 1979-1986

	Actual			Requested	Projected			
	FY79	80	81	(Reagan) 82	(Carter, modified) (83)	(84)	(85)	(86)
<u>Modernizations of Existing Ships</u>								
CV SLEP	--	--	1	--	1	--	1	--
CV Reactivation	--	--	--	1	--	--	--	--
BB Reactivation	--	--	--	1	1	--	--	--
<u>Total Program</u>	14	11	20	33	(16)	(22)	(20)	(20)

NOTE: Reagan additions (included in table)

FY 1982: One CG-47, two FFG-7, one SSN-688, seven RDF auxiliaries (acquisitions), 2 other auxiliaries (acquisitions), 1 CV reactivation, 1 BB reactivation.

FY 1983: One CVN-68, one LSD-41, one BB reactivation. Others not yet announced.

FY 1984-86: Reagan plans not yet announced.

TABLE 6
U.S. NAVY AIRCRAFT PROCUREMENT, FISCAL YEARS 1980-1986

	Actual		Requested (Reagan)		Projected (Carter, modified)		
	FY80	81	82	83	(84)	(85)	(86)
<u>Carrier Air Wings</u>							
F-14A Tomcat	30	30	30	24	6	--	--
F/A-18A Hornet	25	60	63	84	108	143	209
A-6E Intruder	6	12	12	12	4	4	4
EA-6B Prowler	6	6	6	6	2	2	2
E-2C Hawkeye	6	6	6	6	6	6	6
<u>Helicopters for Escorts</u>							
SH-2F Seasprite	--	--	18	18	--	--	--
SH-60B Seahawk	--	--	18	48	64	74	--
<u>Maritime Patrol Aircraft</u>							
P-3C Orion	12	12	12	12	6	6	12
<u>Other</u>							
AV-8B Harrier (USMC)	--	--	12	24	--	--	--
CH-53 Super Stallion	15	14	14	14	11	11	11
AH-1T (USMC)	--	--	--	--	22	22	--
EC-130Q	3	1	2	2	3	2	--
Various Logistic	22	2	--	8	8	8	8
Various Training	--	92	90	81	--	--	15
<u>Total Program</u>	125	235	283	339	(240)	(278)	(267)

range of the Trident C-4 missile make it very secure against Soviet ASW forces and also eliminate any need to use foreign bases.

Nine Trident submarines have been authorized through FY 1981, and eight are on order from the sole builder of these ships, the Electric Boat Yard at Groton, Connecticut. Unfortunately, the production of these ships, plus the attack submarines building at Electric Boat Yard, has been extensively delayed by a series of problems, mostly relating to quality control in the shipyard. The lead ship, USS Ohio (SSBN-726), will be delivered well over two years late: her contract delivery date was 30 April 1979 but the Navy now estimates that she will not be delivered before December 1981. The Navy is clearly upset by the problems at Electric Boat: it has refused to place the order for the ninth Trident with the company, and it has awarded three attack submarines of the 1980 and 1981 budgets to the only other submarine builder in the U.S., Newport News Shipbuilding and Drydock Corporation, without considering Electric Boat's bid. (Congress followed suit in May 1981 by deferring authorization of the tenth Trident, which had been requested in the 1982 budget, although it also took steps to ensure that this action would not delay delivery of the ship.) The Navy is considering a number of alternatives to construction of SSBNs at Electric Boat, including use of other yards and adoption of a smaller design for the ship, but these options would all be enormously expensive in time and money and the Navy's best answer is

probably to help Electric Boat resolve its problems. The Navy hopes to continue authorizing one ship per year through 1984 and increase to three ships every two years, starting in 1985.

The U.S. strategic submarine force remains strong despite the delays in Trident. Twelve of the existing SSBNs are being fitted with the Trident C-4 missile which has the same accuracy as the Poseidon C-3 missile but twice its range, which enables them to patrol further from their targets and from Soviet ASW forces. Five of these converted submarines are already in service. Nineteen SSBNs will remain in service with the Poseidon C-3 missile, and their service life will be extended to 30 years. On the other hand, current plans are to retire the ten oldest SSBNs, which still have the non-MIRVed Polaris A-3 missile. Eight of these will be used as attack submarines while the other two, which need new reactor cores, are being dismantled. The entry into service of the first Trident will more than compensate for the loss of the missiles in all ten Polaris submarines, although, for a time, the reduction in the number of U.S. SSBNs will be impressive.

The Trident-class submarine can physically carry a missile much larger than the Trident C-4. It would be possible to improve the accuracy of the C-4 or to design a new, larger, D-5 missile that would have even greater range and sufficient accuracy to be effective against the hardest targets. The decision concerning

the characteristics of the next-generation submarine-launched ballistic missile has not yet been made.

Carrier Battle Groups

The carrier battle group is considered to be the backbone of today's Navy, and it is expected to remain so well past the year 2000. In the last years of the Carter Administration, several steps were taken to strengthen the carrier force. After a two-year battle, Congress succeeded in including a new large nuclear carrier (CVN-71) of the Nimitz (CVN-68) class in the 1980 budget. (She is scheduled to be delivered in 1988.) In doing so, Congress ended for the time efforts to build a new type of aircraft carrier smaller and less expensive than the Nimitz, although smaller designs are still being studied by the Navy. In addition, in response to the situation in the Indian Ocean, the Carter Administration decided to retain the old carrier Coral Sea (CV-43) in service through Fiscal Year 1986 rather than having her replace Lexington as a training carrier when Carl Vinson (CVN-70) joins the fleet in 1982. The carrier force will thus increase to 13 ships in 1982, (excluding one ship, Saratoga, in reconstruction under the Service Life Extension Program), and the Navy wants to increase that force to 15 carriers. As a first step in this direction, the Administration plans to request another new carrier

(CVN-72) in the 1983 budget, and has included some initial funds for the ship in the 1982 budget.

In the meantime the Navy plans to refurbish and modernize the four oldest Forrestal-class carriers at a rate of one every two years under the Service Life Extension Program. Saratoga began her modernization in 1981, and the fourth ship will complete hers in 1989. This program increases the expected life of a carrier from 30 to 45 years, and, if it is extended to cover the newer carriers, it will ensure that all of the carriers now in existence except Coral Sea and Midway will be in service until at least the year 2000.

The Reagan Administration has also proposed reactivating the carrier Oriskany in 1982 to help meet Navy carrier commitments until new carriers are completed. The Oriskany is smaller than Midway-class carriers and has the capability to operate A-4, A-7, A-6, F-8 and E-2 aircraft, although her initial air group would probably consist primarily of A-4s. For a number of reasons, this reactivation has encountered opposition in Congress, and some key committees have refused to approve funds for it.

The newest aircraft now being purchased for use on carriers is the F/A-18 Hornet. It is a dual-purpose aircraft that will eventually replace the A-7 in all 24 Navy light attack squadrons

and the F-4 in six Navy fighter squadrons. (The other 18 fighter squadrons will fly the F-14 Tomcat.) Current plans are to purchase 1366 F/A-18 for the Navy and Marines, and it will remain in production into the 1990s.

The other principal part of a carrier battle group is the cruisers and destroyers that help defend the carrier from attack by submarines and by aircraft. Today the Navy is generally satisfied with the protection it can give its carriers against submarines, but, due to the introduction of the Soviet Backfire aircraft, the large number of cruise missiles that can be launched by Soviet aircraft and submarines, and the extensive use made by the Soviets of electronic warfare, it feels that it must make major improvements in the carrier's air defenses. This is even more urgent because the areas close to the Soviet Union in which Admiral Hayward wants to operate are these in which the Soviet air threat is the greatest.

A U.S. carrier battle group has three lines of defense against aircraft. Farthest from the carrier are the carrier's interceptor aircraft, which attempt to engage enemy aircraft and missiles before they can get near the carrier. The F-14 Tomcat and its Phoenix missile will carry out this mission for the foreseeable future, supplemented by the smaller F/A-18 Hornet with shorter-range Sidewinder and Sparrow missiles. Closer to the car-

rier are surface ships with long-range air defense missiles. The Tartar and Terrier systems of past years are being replaced by the medium range (MR) and extended range (ER) variants of the Standard (SM) missile. A second-generation of Standard missiles (SM-2) is now in production, and during the 1980s existing missile ships will be fitted with it. Closest to the carrier are the point-defense systems on the carrier and its escorts: these consist of a short-range missile, the NATO Sea Sparrow, and a new air-defense gun, the Vulcan-Phalanx, which has an extraordinarily high rate of fire and whose operation is entirely automatic. Vulcan-Phalanx became operational in the fleet in 1980 and will ultimately be fitted to over 200 ships.

The main development in the U.S. Navy's air defense, however, is the AEGIS anti-air warfare system. Formerly the main functions of AAW, including detection, tracking and engagement, were performed by separate systems. AEGIS combines all these function in a single system, and therefore greatly increases the speed and accuracy of the ship's response to air attack. An additional benefit of AEGIS is that it can also coordinate AAW activities of non-AEGIS ships in its vicinity.

The Navy has drawn up plans for the forces that will escort carrier in the future, and these are built around AEGIS. For a battle group containing two carriers, the Navy feels it will need

three AEGIS cruisers, five other cruisers and destroyers armed with anti-air missiles, and four destroyers of the Spruance (DD-963) class for ASW protection. Today, there are no AEGIS ships in service, and by the year 2000 all existing missile cruisers and destroyers except the six most recent nuclear cruisers and the four Kidd (DDG-993) class missile destroyers will be overaged. A major construction effort is therefore necessary in this area.

Procurement of AEGIS cruisers began in 1978 when Ticonderoga (CG-47) was authorized: she carries the AEGIS system and its missiles in the hull of a Spruance-class destroyer. (The idea of also building larger, nuclear-powered AEGIS cruisers seems to have been abandoned.) Through 1981 four ships of the Ticonderoga-class were authorized. A major change in their design will occur in CG-52 and later ships which will have a vertical-launch anti-aircraft missile system instead of the type in use today.

The main problem with AEGIS ships is that they are extremely expensive and cannot be built in large numbers. Accordingly the Navy is now preparing designs for a ship known as DDGX which can be built in sufficient numbers to replace both the cruisers and missile destroyers in service today. Its characteristics have not yet been decided upon, but it will probably have a vertical-launch anti-aircraft missile system, a radar system derived from the one used in the AEGIS system, and gas-turbine propulsion. The current

concept is for a ship in the 6000- to 6500-ton range. The Reagan Administration has increased funding for development of this design so that the lead ship can be ordered in 1985 instead of 1986 as planned by Carter. For a 15-carrier Navy, one recent Navy study estimated it would need 27 AEGIS cruisers and 63 DDGX for carrier battle groups and for other purposes by around the year 2000. (These would be added to the six newest nuclear cruisers in today's fleet, the four new destroyers of the Kidd class, the 31 new destroyers of the Spruance class, and six additional destroyers to produce a total of 137 cruisers and destroyers in the 600-ship Navy.) The AEGIS cruiser and the DDGX are thus likely to be key features of Navy building programs for many years to come.

Due to the Navy's shortage of carriers and its need for additional forces with an offensive strike capability, the Navy study just referred to provides for four "surface action groups," or task groups of surface ships without a carrier. The ships in these groups would be equipped with Tomahawk and Harpoon cruise missiles so they could strike both sea and land targets. The naval Tomahawk has a 250-mile range and will exist with both conventional and nuclear warheads. These groups would rely on AEGIS for defense against aircraft. Ultimately, each group would consist of one AEGIS cruiser and three DDGXs.

The Reagan Administration has added another element to the surface action group concept. It plans to reactivate the battleship New Jersey in 1982 and her sister Iowa in 1983. These ships would carry Tomahawk missiles and Vulcan-Phalanx guns in addition to their 405 mm guns and could probably remain in service for 15 years. The Navy hopes ultimately to reactivate all four battleships, one for each surface action group. These reactivations have been criticized in Congress due to the age and obsolescence of the ships, but most members of Congress appear to agree with the Administration that they are a good way to augment rapidly the Navy's striking power.

It should be noted that the ability of U.S. naval forces of all types to attack enemy surface ships has already been greatly improved by the introduction of the Harpoon missile. By the end of 1980 Harpoon was carried by 131 surface ships, 27 P-3C aircraft and over 21 submarines, and all modern units of these types will soon receive it.

Convoy Escorts and Other Anti-Submarine Forces

The U.S. has a large force of frigates for sea-lane defense and operations in areas where the air threat is not intense. It is currently building the Oliver Hazard Perry (FFG-7) class missile frigate, which, including three ships requested by Reagan in

the 1982 budget, contains 48 ships. The primary mission of these ships is to protect shipping against submarines, but they can also provide some protection against air attack with their SM-1 (MR) anti-air missiles.

The Carter Administration planned to end construction of this class in 1982 and begin construction in 1984 of the FFX, a ship costing half as much as the FFG-7 and designed to be operated by the Naval Reserve Force in support of mercantile convoys. Such a ship would necessarily be very austere, and for that reason it has already encountered criticism. Work on this design was interrupted in 1981, and the new administration has not yet indicated its intentions concerning the future of the frigate program. The Navy estimates that a 600-ship Navy would need 101 frigates to escort military convoys and help protect the Navy's underway replenishment and amphibious group.

Anti-submarine warfare (ASW) is not considered as urgent a problem as anti-air warfare because the U.S. possesses some significant technological advantages, notably in sensors and in submarine quieting. Nonetheless, the Soviet submarine force is very large, and its technology is improving, as shown by the high speed and deep-diving capability of the Alfa-class submarine.

The FFG-7 class frigate reflects some major changes in the U.S. approach to ASW by surface ships. While earlier frigates used large active sonars for detection and shipboard weapons for attack, the FFG-7 relies primarily on passive sensors for detection and on helicopters for attack. The passive sensor, called TACTASS, is a long array of listening devices towed behind the ship. (A similar system is also being fitted to Knox (FF-1052) class frigates.) The helicopter that will ultimately be carried in the FFG-7 class (and also in Spruance-class destroyers and Ticonderoga-class cruisers) is the SH-60B Seahawk, otherwise known as LAMPS Mark III, of which 204 are ultimately to be built. The assembly line for the original LAMPS Mark I, the SH-2F Seasprite is also to be reopened to build 90 additional helicopters. Many ships, including the Garcia (FF-1040) and Knox-class frigates, already carry the SH-2F.

Surface ships are not the only ASW forces in the Navy. ASW is one of the principal missions of attack submarines, which are discussed below. Land-based ASW forces also are important. The Navy is continuing to build P-3C aircraft for its maritime patrol squadrons. Seventeen squadrons have this aircraft today, and all 21 will have it by 1991. To improve the ability to conduct acoustic surveillance in areas where the use of fixed systems is inappropriate, the Navy is building the TAGOS-1 class of trawler-type vessels which tow the SURTASS passive sensor away. Finally, ASW

weapons are receiving considerable attention: the NEARTIP program will improve the Mark-46 torpedo, used by surface ships and aircraft, and the ADCAP program will improve the Mark-48 torpedo, used by submarines. A new lightweight torpedo (ALWT) is in development to replace the Mk-46. Finally, a new ASW Standoff Weapon is being developed to replace the SUBROC now carried by U.S. submarines. Unlike SUBROC, the new weapon will have a conventional as well as a nuclear warhead.

Attack Submarines

U.S. nuclear-attack submarines have a number of important missions, and that number has increased in recent years. They retain the traditional mission of conducting offensive operations against shipping deep in enemy-controlled areas. In the war with the Soviets they would also maintain barriers in key choke points to prevent the movement of Soviet forces (especially submarines) into the sea lanes vital to the Western war effort. More recently they have been assigned the mission of providing direct support to U.S. carrier battle groups. Their newest mission is to attack land targets in enemy territory (particularly naval bases and airfields) with long-range Tomahawk cruise missiles.

The U.S. is now building the Los Angeles (SSN-688) class nuclear attack submarine, a large and fast ship of which 37 have

been authorized through 1981 and of which the 11th was commissioned in March 1981. Studies of a less expensive SSN, referred to as FA-SSN, have been terminated, and any new SSN design would probably be an improved Los Angeles. Carter planned to build one to two submarines per year in order to achieve and maintain a force of 90 nuclear-attack submarines. This figure will be reached in Fiscal Year 1982, thanks in part to the conversion of eight SSBNs to SSNs, but the Navy estimates that a building rate of three submarines per year would be needed to keep it there as existing SSNs are retired in the 1990s. The Navy now advocates constructing three to four of these ships per year in order to build up to a 100-ship force. In view of this increased effort, plus the production delays already discussed at Electric Boat, the Navy is considering the possibility of opening an additional submarine shipyard to supplement the two yards now building SSNs. Some Navy officials prefer to resume new construction at the Mare Island Navy Yard, which built SSNs in the 1960s, but other yards, both government and private, are under consideration. The Secretary of the Navy has also mentioned the possibility of building ships overseas, but such a move would be vigorously opposed in Congress.

A major change to the SSN-688 class that is funded for the first time in the 1982 budget is the addition of Tomahawk cruise missiles, which will be fired from vertical-launch tubes placed

forward, outside the pressure hull. These tubes will be fitted during construction to all Los Angeles-class submarines beginning with SSN-721, which was authorized in 1980.

Amphibious Warfare

The mission of the Navy's amphibious forces for the last decade has been to land the assault echelon of 1.15 Marine Amphibious Force against opposition by enemy forces ashore. Only one class of amphibious ship, the LSD-41, is currently in the building program. The purpose of the LSD-41 program, initiated in 1981 after many delays, is to replace the eight oldest amphibious ships, the LSD-28 class, which were built in the 1950s. The Navy estimates that it will need nine of the LSD-41 class, and it appears likely that Congress will approve more ships for 1982 and 1983 than the administration has requested. The LSD-41 class can carry the LCAC, the first U.S. amphibious air cushion vehicle. A much larger effort will be required if the new administration approves the Navy's proposal to increase its amphibious capacity from 1.15 to 1.50 Marine Amphibious Force. In addition, most of the existing amphibious ships were completed in the 1960s and will have to be replaced during the 1990s. The Navy hopes to include an LHA of the Tarawa class in the 1983 budget and to begin in 1985 a new class called LHDX, which is currently a 39,500-ton design carrying both helicopters and boats.

Mine Warfare

The U.S. has not completed a minesweeper for its own use since 1961, and now has only 25 old minesweepers. It estimates that it needs a minimum of 31 mine warfare ships. In 1982 the first ship of a new class of mine countermeasures ships (MCM) is to be authorized. The MCM is designed primarily to locate and destroy mines in deep water. Plans are to build 14 of a relatively simple class and then introduce another class around 1984. The Navy will continue to rely on helicopters for mine countermeasures in shallow water. The 1982 budget also includes funds to extend the life of the existing minesweepers to 1991 to prevent a further decline in the mine warfare force.

Rapid Deployment Force Support

There are numerous other programs underway, both in the areas already mentioned and in others, but there we will discuss only one of them which has been in the news recently: Navy support for the Rapid Deployment Force (RDF). The RDF is a large force of troops designed for service overseas, but, unlike Navy and Marine Corps amphibious forces, it is not designed to be put ashore against opposition. In addition to existing forces the Navy is expected to contribute to the RDF two types of ships: Maritime Prepositioning Ships, which are kept on station in potential cri-

sis regions with Army and Marine Corps equipment embarked, and Fast Sealift ships, which will rapidly transport equipment from the U.S. to a crisis region. In August 1980 the U.S. stationed in the Indian Ocean its first seven prepositioning ships. For this purpose the Navy ultimately plans to acquire and lengthen four or five Maine-class roll-on, roll-off cargo (RO-RO) merchant ships and build eight RO-RO ships of a new 49,000-ton type. To provide fast sealift, the Navy is acquiring the eight large 33-knot containerships of the SL-7 class, which it will convert to RO-RO configuration. It is worth noting that these ships will not help achieve the 600-ship Navy advocated by the Navy's leaders: a recent decision put them into a category (Military Sealift Command ships not in the Naval Fleet Auxiliary Force) that is not included in calculations of the strength of the Navy.

CONCLUSION

It seems fair to conclude from this survey of U.S. Navy plans and programs that there is considerable reason to hope that the Navy will continue to be able to carry out its missions despite the challenges of the 1980s. There appears to be a new consensus on the nature and importance of the Navy's missions and also on the major categories of forces that should make up the fleet. The new Reagan Administration has indicated its intent to provide additional funds, and has done so in its first budget. It has also

indicated a willingness to provide funds to help solve some major Navy problems not discussed here, notably personnel retention, training and readiness. (So far, the personnel situation seems to be reacting favorably to major increases in pay and benefits passed by Congress in 1980.) It remains to be seen, of course, whether the Reagan Administration can actually provide the money needed to continue the expanded Navy programs after 1982. It also remains to be seen whether the decisions made concerning the missions of the Navy, the structure of the fleet and the characteristics of new weapons systems are really appropriate to the world of the 1980s. Despite these questions and other problems that will certainly arise, the future of the U.S. Navy today looks brighter today than it has for quite a few years.

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